



SMITHSONIAN INSTITUTION  
U. S. NATIONAL MUSEUM

Vol. 92

Washington: 1942

No. 3144

## RHOPOCRINUS, A NEW FOSSIL INADUNATE CRINOID GENUS

By EDWIN KIRK

The new crinoid genus here described ranges from the St. Louis (or perhaps Ste. Genevieve) well up into the Chester group. Specimens have been found in Illinois, Tennessee, Alabama, and Kentucky. One new species and two described species are referred to the genus. In addition two new species are known. A new family is proposed for the reception of this and certain other Mississippian genera:

### PACHYLOCRINIDAE, new family

Crown compact and as a rule comparatively low. Dorsal cup broadly turbinate to basin-shaped. Three anal plates in cup. Ventral sac composed of numerous vertical rows of small plates. Sac reflexed. Arms isotomous in early forms, evolving through stages of endotomy to parentotomy. *IBr*, two, but variation is possible in *ant R*. Column pentagonal in early forms, becoming circular in section in later phylogenetic development.

*Contained genera.*—*Pachylocrinus*, *Rhopocrinus*, *Hylodecrinus*.

*Remarks.*—This family is segregated from the amorphous group commonly designated as Poteriocrinidae. More exactly, it represents a part of the family Scaphiocrinidae as conceived by Bather. *Scaphiocrinus* is a synonym or close ally of *Graphiocrinus*, and Bather in making the family was laboring under a misapprehension as to the real nature of the genus. I am elsewhere proposing the family Zeacrinidae for some of the structural types included by Bather in his Scaphiocrinidae, and the Pachylocrinidae will take care of part

of the residue. The Pachylocrinidae probably evolved from a Devonian stock much like *Decadocrinus*, or perhaps from *Decadocrinus* itself.

#### RHOPOCRINUS, new genus

*Genotype*.—*Rhopocrinus spinosus*, new species.

*Generic diagnosis*.—

Crown. Medium height, compact.

Dorsal cup. Broadly turbinate. Plates smooth or with pits at angles of plates and low folds normal to the faces. In all known species there is a sharply defined vertical groovelike depression between adjacent *RR*.

*IBB*. Small, but showing in lateral view.

*BB*. Large.

*RR*. Large. Articulating facet extends nearly full width of *R*, linear to slightly crescentic. Suture not gaping.

*IBr*. Low, stout. Typically two in all rays.

Arms. Stout in the basal portion, becoming slender distad. Para-endotomous—that is, above the *IIA* $\alpha$  rami are given off to the inside of each half-ray. The intervals between successive rami are short, there being as many as four or more rami in series above the *IIA* $\alpha$ . This gives the arms a great number of divisions. The axillaries tend to be spinous, in some cases the spines being of considerable length. The brachials are cuneate and in some cases do not reach to the far side of the ramus.

*Post IR*. *RA* is large. *X* is large, the greater part of the plate lying above the plane of the radial facets. *RT* is large. As in the case of *X*, but a small part of the plate lies within the dorsal cup proper.

Ventral sac. The ventral sac is formed of large numbers of small plates. The sac is wide and extends to three-fourths or more of the height of the arms. The distal portion bears a number of stout spines. The plates of the sac tend to be nodose, with well-defined pits at the angles of the plates.

Column. The column is circular in section and has a pentalobate lumen. The nodals are very prominent and bear cirri to within 8 cm. of the crown in medium-sized specimens of the type species.

*Characteristic species of the genus*.—

#### RHOPOCRINUS MUNICIPALIS (Troost), new combination

*Poteroocrinites municipalis* TROOST, 1849, p. 419, *nom. nud.*

*Poteroocrinites municipalis* TROOST, 1850, p. 61, *nom. nud.*

*Poteroocrinites municipalis* TROOST, 1909, p. 82, pl. 11, fig. 5. "St. Louis limestone, Lawrence County, Tennessee." (Probably Gasper.)

*Cyathocrinus? municipalis* (Troost) WOOD, 1909, p. 82.

## RHOPOCRINUS PROBOSCIDIALIS (Worthen), new combination

*Poteriocrinus proboscidualis* WORTHEN, in Worthen and Meek, 1875, p. 518, pl. 31, fig. 1. "Upper division of St. Louis limestone, Carondelet, Missouri." (Ste. Genevieve?).

*Poteriocrinus* (*Scaphocrinus*) *proboscidualis* WACHSMUTH and SPRINGER, 1880, p. 114 (339).

In addition there are at least two new species in the collections.

*Geologic and geographic distribution.*—The genus as known is chiefly found in the Chester. One species, *Rhopocrinus proboscidualis* (Worthen), was described as from the upper part of the St. Louis. This might well be Ste. Genevieve as now known. Another undescribed species is from the "Ste. Genevieve" near Huntsville, Ala. Another undescribed species is from the Gasper of the same region. Troost's species *R. municipalis*, judged by the lithology of the matrix, may well be Gasper. The type species, *R. spinosus*, is from beds stated to be Glen Dean.

*Relationships.*—*Rhopocrinus* has no apparent relationship with any known upper Mississippian crinoid genus. Among lower Mississippian genera it most nearly resembles *Pachylocrinus*. *Rhopocrinus* may readily be distinguished from *Pachylocrinus* by its turbinate cup and parendotomous arms as against the depressed, bowl-shaped cup and endotomous arms of the latter.

## RHOPOCRINUS SPINOSUS, new species

## PLATE 16

Of this species there are three well-preserved crowns, one with some 14 cm. of column attached. In addition, there is a partial set of arms, more complete in the distal portion than in any of the crowns. The crowns, though of fairly large size for Chester inadunates, appear to be of medium size for the species. The crown is compact. With the relatively inconspicuous cup and the many branched arms with their spinous axillaries the crinoid presents a striking appearance.

The dorsal cup is low and turbinate. It is composed of thick tumid plates. There is a sharply defined groovelike depression between each pair of radials. The *IBB* are small, not visible in lateral view, and almost completely covered by the column. The basals are relatively small. The radials are large. The radial facet is linear and extends almost the full width of the radial. *RA* is large, resting on *post* and *r post BB*, but not entering deeply between them. *X* is likewise large and rises well above the plane of the *RR*. *RT* is likewise large.

There are two *IBr* in each ray. The *IBr* are low and heavy. In the *r post R* of one of the paratypes the first bifurcation seems to

have been suppressed, and there are 10 *IBr*. This is abnormal and may be due to regeneration. The *IIBr* vary in number from four to eight. Above the *IIA* $\alpha$  the rami of each half-ray show endotomous branching, the number of *Br* between axillaries steadily increasing in number distad. The *IA* $\alpha$  and *IIA* $\alpha$  are nodose, but the axillaries above are, as a rule, spinous. In the proximal portion of the arms the *Br* have subparallel faces, but passing distad they become cuneate. The pinnules as a rule are poorly shown. They are of moderate length and slender.

The ventral sac is long, reaching to the tips of the arms, at least in medium-sized specimens. In larger specimens the arms may well have extended above the top of the sac. The ventral sac is composed of numerous vertical series of fairly small nodose plates. The walls of the sac seem to have been incompetent, for, as seen, the sac is flattened, distorted, and thrown into folds. The apex of the sac seems to have been somewhat flattened and carries a marginal fringe of stout spines.

The column is stout, circular in section, and has a pentalobate lumen. The nodal and internodal series are well marked, the nodals being unusually prominent. In the holotype cirri are borne by the nodals to within 8 cm. of the crown.

*Relationships.*—From *Rhopocrinus proboscidiialis*, *R. spinosus* may readily be distinguished by its broadly turbinate cup. The *RR* of *R. municipalis* are more highly arched, the *IBr* are relatively narrower and higher, and the arms relatively more slender for specimens of the same size than in *R. spinosus*.

*Horizon and locality.*—The types and only known specimens of the species are from what is known as Glen Dean near Sloans Valley, Pulaski County, Ky. The specimens are from the railroad tunnel and were collected by Bernhardina and Charles Wachsmuth.

*Types.*—The holotype, No. S4409a, and paratypes, No. S4409b, c, are in the Springer collection in the United States National Museum.

#### RHOPOCRINUS MUNICIPALIS (Troost), new combination

*Rhopocrinus municipalis* is represented by a badly preserved, silicified specimen, the holotype, and one even poorer specimen in the same block of limestone. The type shows part of the dorsal cup and portions of the arms. The state of preservation is so poor that it is doubtful whether the species can be identified with certainty in the future unless a series of well-preserved specimens can be found.

The crown has an approximate height of 9 cm. The arms, when the size of the cup is considered, are relatively slender and are well

separated at their bases. This gives the crown the more open character characteristic of the earlier species.

The dorsal cup has an approximate diameter of 20 mm. and a height of approximately 7.5 mm. The sides of the cup are somewhat convex, giving the cup a bowl-shaped contour. The plates are tumid. The most striking feature of the cup, and the character that can best be used to identify the species, is the radials. These are very highly convex and might readily be taken as part of the *IBr* series. This, of course, means that the interradial vertical groove is very deep.

The proximal portions of the arms are widely separated as between adjacent rays. The brachials have highly arched backs and are deep. The *I* and *IIAx* are smooth. One *III Ax* shows a short, blunt spine. In the higher orders of *Br* many brachials fail to reach to the far side of the ramus.

*Horizon and locality.*—Troost's original label and manuscript give no information about the specimens other than "Lawrence County, Tennessee." Many specimens were given to Troost, and at times his localities are erroneous. In this case the locality may well be correct. Charles Butts, who knows the general region well, says that beds as high as Gasper may occur in the county. The lithology of the rock might well be Gasper. The crinoid itself suggests a higher horizon than Ste. Genevieve. Until proved otherwise, we may accept the locality and assume a Gasper age.

#### LITERATURE CITED

##### TROOST, GERARD.

1849. Communication. Amer. Journ. Sci. and Arts, ser. 2, vol. 8, No. 24, pp. 419-420.
1850. A list of the fossil crinoids of Tennessee. Proc. Amer. Assoc. Adv. Sci., 1849, pp. 59-64.
1909. A critical summary of Troost's unpublished manuscript on the crinoids of Tennessee. (Edited by Elvira Wood.) U. S. Nat. Mus. Bull. 64, xi+150 pp., 15 pls.

##### WACHSMUTH, CHARLES, and SPRINGER, FRANK.

1880. Revision of the Palaeocrinoidea: Pt. 1, pp. 1-153, pls. 1-3 (15-17). Proc. Acad. Nat. Sci. Philadelphia, 1879, pp. 226-376, pls. 15-17.

##### WORTHEN, AMOS HENRY, in Worthen, A. H., and Meek, F. B.

1875. Description of invertebrates. Illinois Geol. Surv., vol. 6, pt. 2, sect. 2, pp. 489-532, pls. 23-33.